

# BIL 415 - Image Processing Practicum

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**HACETTEPE UNIVERSITY**

Department of Computer Engineering

**Problem Set 2**

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## Create Your Own Image Effects

Due Date: 23:59pm on Friday, October 31st, 2014



a) Input



b) Created Effect

Figure 1: Input image and created image effect by using various image operations

## Background

Image editing is the one of the most fundamental topics of image processing and computational photography. There are many tools to edit image for giving or changing appearance by using different image operations. Some of popular tools are Adobe Photoshop, GIMP and Picasa.

Recently in the social media(Facebook,Instagram), there is a trend toward giving photos different image effects and sharing them with friends. This upward trend was noticed by social media managers and they provided their users a simple image editing tools. These simple editing tools let the user to perform different operations on the images for various image effects.

In this assignment you will use Matlab to create your own image effects by performing different operations on the images. I created a sample effect on the Gandalf image in Figure 1-a and obtained image in Figure 1-b by following the same way. In this sample, firstly I adjusted the contrast and then increased the Red and Green values to obtain warmer image. Secondly I transformed this warmer image HSV color space from RGB color space so that saturation of the image can be adjusted. I increased the image saturation and paint the pixels by black color by skipping one pixel to give non-photorealistic appearance. For more cartoon like image, I quantized image brightness values and lastly I adjusted image contrast after histogram equalization to obtain more vivid image.

## Overview

The goal of this assignment is to perform various type of image operations and compose these operations to create your own image effects.



a)Original image



b) Invert image



a)Darken image



b) Lighten image



a)Thresholding



b) Gamma correction



a)Quantization



b) Histogram Equalization



a)Lower contrast



b) Raise contrast



a)Contrast adjustment

Figure 2: Some basic image operations.

## Details

Your program will take an image as input and produce a new image with your image effects. Specifically, you should carry out the following steps:

- You can use any image operation to compose your image effect. Some basic image operations are shown in Figure 2.
- You must create 3 different image effects and show each step you followed to obtain these image effects.
- Your image effects must be general not specific to an image. You can define parameters to control amount of different operations.
- You must explain why you used these steps and how these steps affect the images.
- You are free to create your own image effects and you can benefit professional image editing tools.

## Grading

- 0 (*no submission*), 20 (*an attempt at a solution*), 40 (*a partially correct solution*), 3 (*a mostly correct solution*), 60 (*a correct solution*), 80 (*a particularly creative or insightful solution*).
- Good report preparation and your comments on problem and results you obtain will be graded over rest 20 points.
- After your submission I will preselect your image effects and then ask you which effect is the best. Selected first three students will earn bonus points and their image effects will be published in course web page.

## What to Hand In

You are required to submit all your report along with a short report in *PDF*. For that purpose, prepare a folder which name is your *Student\_Id* containing

- `README.txt` (*text file containing details about your project*)
- `code/` (*directory containing all your code*)
- `report/` (*directory containing all your documents, including your images*)
- `report/data/` (*including your data images*)
- `report/result/` (*including your result images*)
- `report/pset2.pdf` (*pdf report*)

Archive this folder as `studentid_pset2.zip` and submit to Submit System.

Your PDF report should contain a brief overview of the problem, the details of your approach, and the results of your algorithm on at least 5 images for each image effects you created with your comments. Show the results of all of the main steps and why you use these steps and how these steps affect the images.